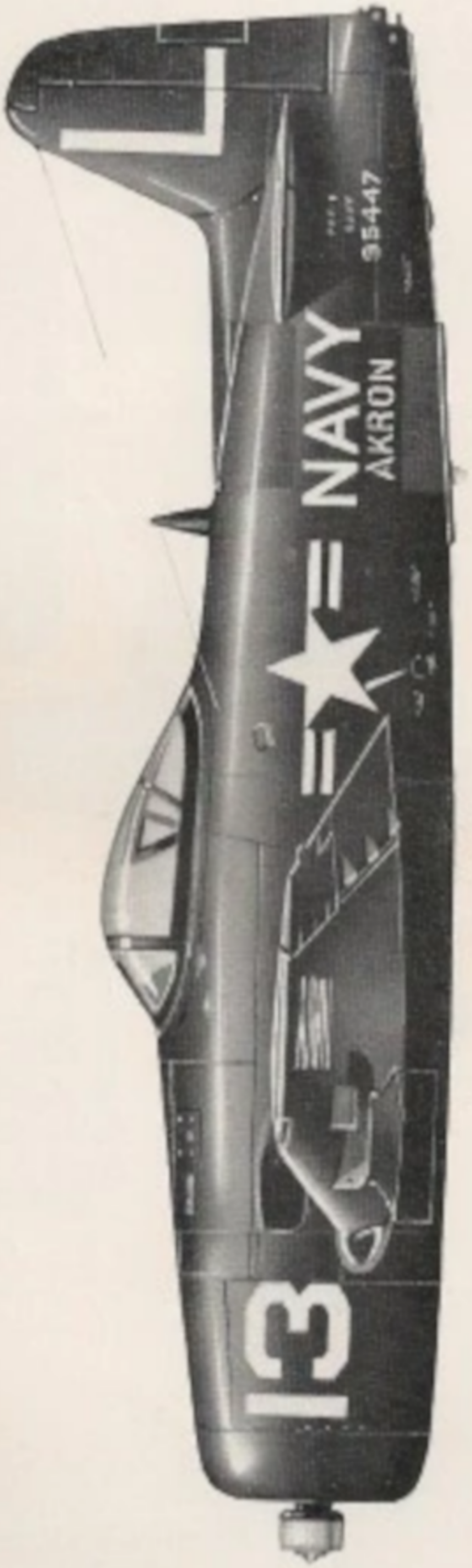
PROFILE PUBLICATIONS

The Grumman F8F Bearcat

NUMBER 107

TWO SHILLINGS


NAVY
AKRON
95447
13

The Grumman F8F Bearcat

by Hal Andrews

An F8F-1 landing on the U.S.S. Tarawa (CV-40) during VF-20A's carrier qualification programme. (Photo: Ed Wischnowski)

"This is the first real fighter I've flown!"
Attributed to a combat experienced Navy fighter pilot after his initial flight in a Grumman XF8F-1 Bearcat, these words are typical of the enthusiastic response to the Navy's newest Grumman fighter in the late stages of the Second World War. Formal evaluations and performance figures generally support this reaction. While the Bearcat was just a little too late to demonstrate in combat that it measured up to the promise of these opinions and figures, there is little evidence to indicate that it would not have done so.

The story of the Bearcat began in the summer of 1943. Grumman's production lines were turning out large quantities of F6F-3 Hellcats; these saw their first combat action in August. Design engineering for the large, heavily armed, twin engine XF7F-1 was essentially complete, with construction of the initial airplanes well along. The Hellcats represented a considerable improvement over the earlier Grumman Wildcats, which were still the only fighters on U.S. Navy carriers in combat. And the new F7F promised much needed further improvements in range, firepower and speed. These two types were respectively representative of those going into action and being developed for the Navy at that time, with some emphasis on high altitude fighters with supercharging.

Against this background, and the characteristics of Japanese aircraft with their extremely clean aerodynamic design, minimum weight, and resultant high speed and manoeuvrability, Grumman engineers and designers under Chief Engineer William Schwendler worked up their design 58 to fill a major gap in the current and future U.S. carrier type fighters: a minimum weight interceptor, with maximum performance in the low and medium altitude ranges. The goal was a fighter similar in size to the Wildcat, but having superior speed, rate of climb and manoeuvring capability in the low/medium altitude range to any of the carrier fighters in service or under development.

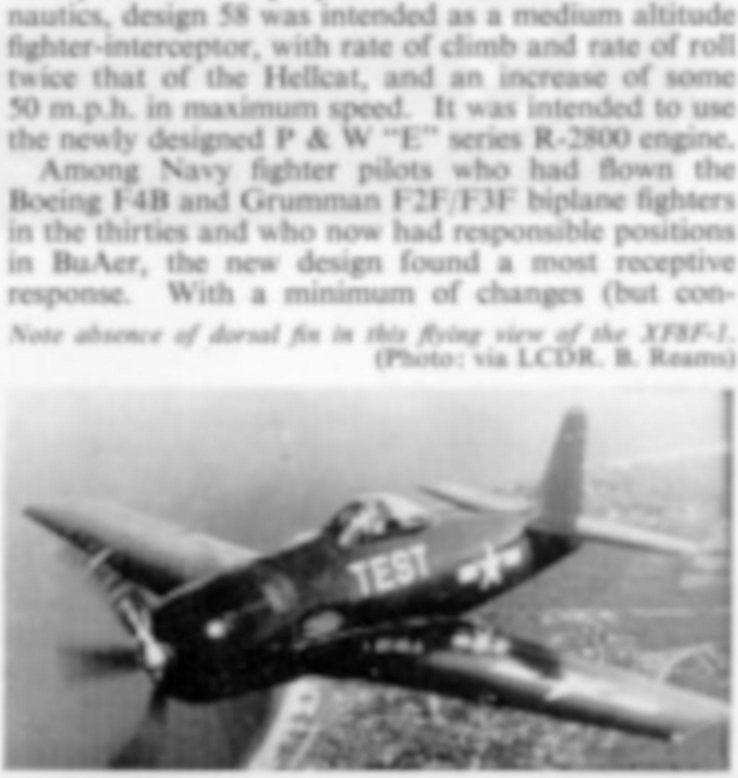
It was desired to provide the same pilot protection as that in the Hellcat, but the armament was reduced to four ·50 cal. guns, these being considered adequate to destroy the less rugged and less protected Japanese aircraft. Maximum carry over of Hellcat design features was a basic consideration, with retention of its good features and correction of any deficiencies. To provide minimum drag, heavier skins with flush rivets and spot welding were used in the new design.

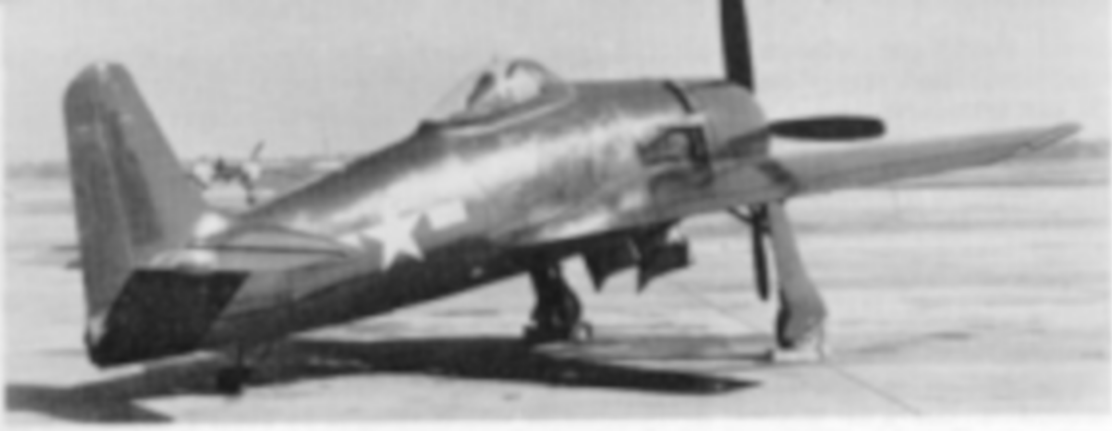
One unusual feature was the incorporation of Safety Wing Tips. Based on experience with other aircraft, it was felt that provision of a "weak" point in the wing or tail structure would insure that the structure would fail at the desired point if the airplane was inadvertantly overstressed. On the new design, this was applied to the outboard portion of the wings, a chordwise section was incorporated just outboard of the centre aileron hinge which would fail at the 9g design load; with reduced span the wing root structure would carry much higher g-loads. Enough aileron would remain to give safe roll control. This provision also allowed some reduction in structural weight since the inboard wing section wasn't designed to carry the design margin of loads that would have been necessary with normal wing design.

All possible improvements in aerodynamic design were incorporated such as in powerplant cowling and cooling and leading edge air intakes, but the NACA 230 series airfoil used on the F6F was continued. Landing gear retraction of the wing mounted main gears was inboard. A bubble canopy was incorporated. As proposed to the Bureau of Aeronautics, design 58 was intended as a medium altitude fighter-interceptor, with rate of climb and rate of roll twice that of the Hellcat, and an increase of some 50 m.p.h. in maximum speed. It was intended to use the newly designed P & W "E" series R-2800 engine.

Among Navy fighter pilots who had flown the Boeing F4B and Grumman F2F/F3F biplane fighters in the thirties and who now had responsible positions in BuAer, the new design found a most receptive response. With a minimum of changes (but con-

Note absence of dorsal fin in this flying view of the XF8F-1. (Photo: via LCDR. B. Reams)





In October 1944, BuNo. 90460 was star attraction at the Joint Fighter Conference and underwent brief flight and armament trials at N.A.T.C., Patuxent River.
(Photo: via Ed Wischnowski)

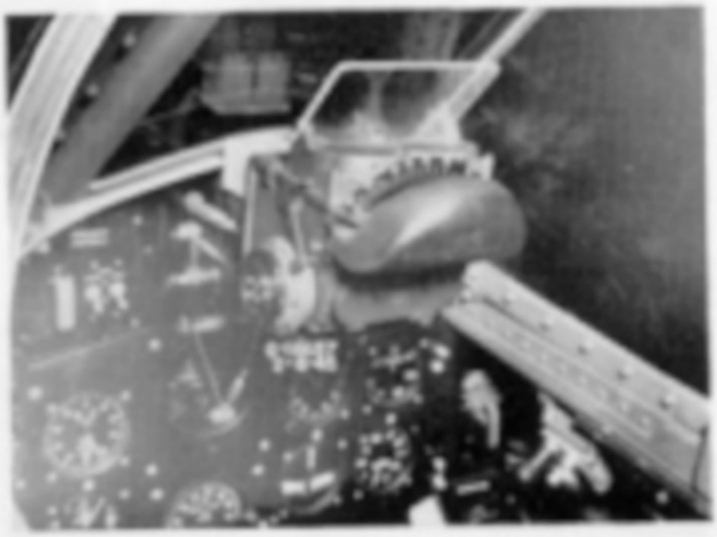
siderable discussion over the fee to be allowed Grumman), agreement was reached to go ahead with the programme.

On 27th November a letter of intent was signed, along with the priority certificate necessary to get the prototypes of a new airplane built under wartime controls. Contract terms called for Grumman to build two prototypes, the first with a P & W R-2800-22 "C" series, two speed supercharger engine and the second with the new "E" series engine with variable speed supercharger. A complete airplane mockup was not required, only power plant installation and cockpit section mockups being called out. The first airplane was to be flown in eight months, the second two months later. Following the F7F-1, the new fighter prototypes were designated XF8F-1. Design proceeded rapidly, with the cockpit mockup inspected in January, 1944; the power plant installation following in March, using the -22 engine. No major changes were ordered; design and construction went ahead on schedule. During April it was decided to install -22 engines in both prototypes due to non-availability of the "E" engine. By late June the first airplane was well along and the contract had been modified to add twenty-three additional XF8F-1 aircraft plus tooling for a production rate of 100 airplanes a month. With the first XF8F-1 scheduled for flight in August, and the second in October, the first of the additional XF8F-1's was scheduled for completion in December. BuNo's assigned at this time were *90437-90461*, with the last two going to the two originally-ordered prototypes. One of the twenty-three additional aircraft was to have the "E" engine (by this time designated the R-2800-30W) installed when it became available, planned for March 1945. The -22 engines to be used in the other twenty-four aircraft also received the W suffix, since water injection provisions were incorporated.

In August the new Grumman fighter was rolled out of the experimental shop and on 31st August, Bob Hall, no stranger to first flights in Grumman fighters, took BuNo *90460* up for the XF8F-1's first flight. Initial reactions were enthusiastic; the airplane's performance was impressive, and it seemed to have few major problems, although it was not without its share of the usual variety of lesser development problems. Engineering and test effort was pushed to solve these problems, including landing gear difficulties and insufficient longitudinal stability. The latter resulted in the addition of one foot to the span of the horizontal tail. With flight results showing that the F8F would give the outstanding performance which had been its designer's goal, some changes were initiated to improve its overall effectiveness. The capacity of the internal fuel tank, which was actually 162 gallons rather than the 150 gallons specified, was to be raised to 175 gallons since space in the tank area under the cockpit was available. As finally delivered the capacity was 183 gallons which gave a useful extension in combat radius over the original 150 gallon figure. Store carrying provisions were also increased to a total of two 1,000 pound bombs plus four 250 pound bombs on wing stations between the landing gear well and the wing fold. These changes were made with minimum weight additions, and minimum reduction of interceptor performance.

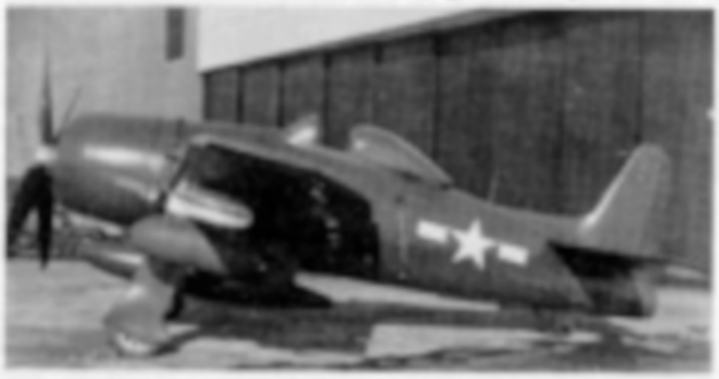
The XF8F-1 made its debut in October—at the Joint Fighter Conference held at the Naval Air Test Centre, Patuxent River, Maryland. While it was there, initial Navy evaluation flights were also made, including brief gun firing trials. While the single XF8F-1 was not available for unlimited flying by the many military test and service pilots or the contractor test pilots participating, it was flown by a limited number of military pilots. It was quite an outing for the only test airplane in flight status, less than two months after its first flight! The results of both the Conference pilot's evaluations and the Navy evaluation were universally a pat on the back for the Grumman designers and also for the Navy officers who had pushed for adoption of Grumman's proposed lighter interceptor design in contrast to the other larger, heavier, long range fighters being developed concurrently for BuAer. Even though only a minimum number of Conference pilots flew the F8F, it received the highest percentage of votes as the best all around fighter below 25,000 feet, and, by a wide margin, as potentially the best carrier fighter (with modifications for carrier operations allowed for the land based types). Only its compact cockpit, lack of lateral trim and of longitudinal trim capability in landing and its directional stability and

F8F-1 cockpit, showing gunsight and instrumentation.
(Photo: Grumman)

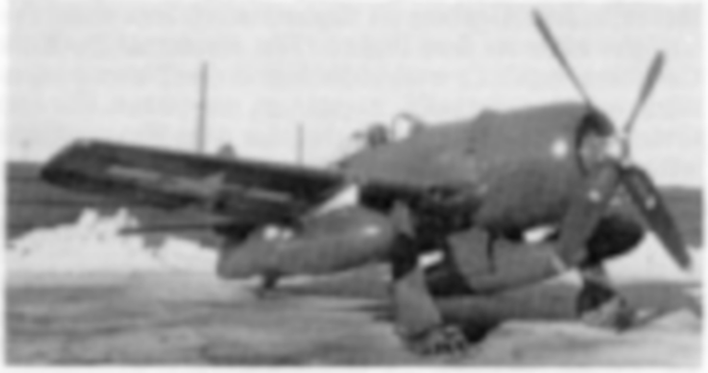


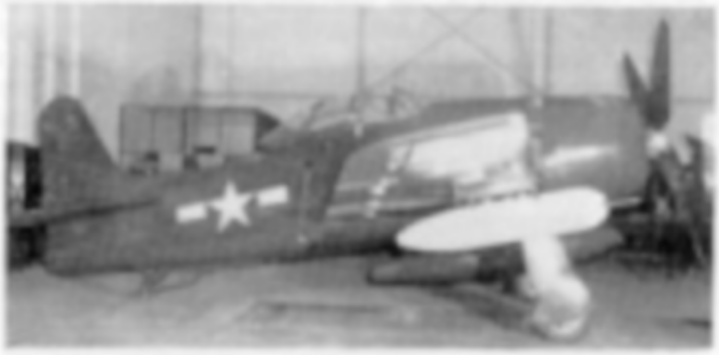
control characteristics received significant adverse comments, though a question was raised regarding the adequacy of its four ×·50 gun armament.

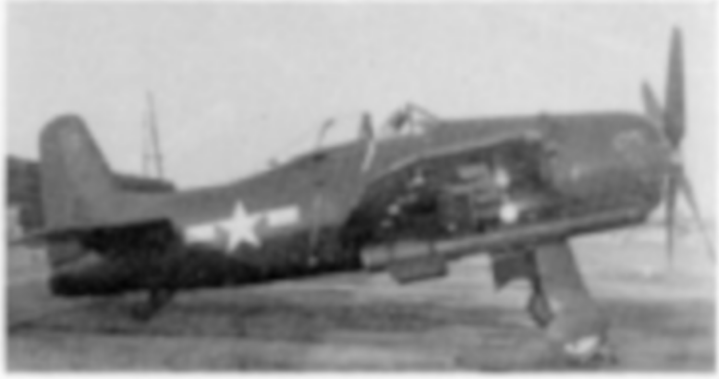
The Navy evaluation was a bit more critical, and many other detailed items were brought up for correction. Action on many of these was already under way, including the directional characteristics and lateral trim. Erratic airspeed system operation, and need for increased speed of landing gear operation and increased airspeed for its operation were other items on which corrective action was considered necessary. In November, the second prototype was flown and the dorsal fin added to the F8F configuration. Provisions for six guns in production aircraft were requested by the Navy, though this change was subsequently dropped, in large part due to limitations on aft movement of the c.g. A Hamilton-Standard Superhydromatic propeller was tested on the first XF8F-1, and while generally satisfactory, the Aeroproducts prop was ordered for production aircraft since there was some question concerning availability of the Hamilton-Standard. Most important was the signing of a contract for 2,000 production F8F-1's, with the twenty-three preproduction airplanes and tooling work initiated in June transferred to the new contract. Production at the rate of 100/month was envisaged by June 1945, with F6F production completely supplanted by January 1946.



BuNo.90438, the second "production" Bearcat, shown at Bethpage in February 1945 during G.A.E.C evaluation of various external store configurations. Shown here, upper to lower, are: 150 gal./centre line tank and two 1,000 lb. bombs; 150 gal. centreline tank and two 100 gal. wing tanks; 150 gal. centreline tank and two Mk. I twin ·50 gun pods; two 11·75 inch Tiny Tim rockets. (Photos: Grumman)







December 2nd saw Grumman test pilot Pat Gallo make the first flight of BuNo *90461*. Initial field arrested landings at Philadelphia and transfer of BuNo *90460* to NACA Langley for full scale tunnel tests followed. The first of the new year saw the first pilot line "production" XF8F-1 completed; the second followed before the end of January. The third, BuNo *90439*, rolled out in February, the last *Bearcat* built in the experimental shop. BuNo *90440*, the first pilot line airplane off the assembly line reached flight status during the same month.

During January initial flight checks were made on range characteristics, using BuNo *90461*; the results proved very disappointing. Investigation showed that in auto-lean, at the low powers required for long range cruise, the mixture was affected by the idle needle, resulting in an excessively rich mixture. P & W engineers came up with a manual leaning control, which proved to be a solution although spark plug fouling resulted, requiring further corrective action. During this same period, engine carburation/ignition problems were also encountered with the first pilot line airplane—a foretaste of things to come. Meanwhile BuAer was negotiating with Eastern Aircraft Division of General Motors to build the Bearcat in lieu of their own XF2M-1 design, since the Bearcat could operate from the escort carriers and offered far superior performance to that of Eastern's R-1820 powered design. A letter of intent for 1,876 Eastern built Bearcats designated F3M-1 was signed on February 5th; these were to be powered by R-2800-34WA or -40 engines, improved versions of the -34W which was replacing the -22W in all production F8F's. Flight test activities during this period included initial flights with the full range of external stores to be carried by the Bearcat and the propeller vibratory stress survey, conducted at Grumman by Aeroproducts engineers. Using BuNo *90461* with a -34W installed, stresses were all found to be below known fatigue strengths, and the installation was approved for production. Stores carried included such loads as 2′ 11·75″ *Tiny Tim* rockets or alternatively two Mk. 1 gun packages on the wing racks of BuNo *90438*. Replacement of the four ·50 guns by 20 mm. cannon was also being studied.

February 17th marked another milestone in the F8F's development, in fact one of the most significant milestones for any carrier aircraft: the first shipboard operations. With *90438* again doing the honours, two Navy pilots from NAAS Mustin Field, Philadelphia, LCDR's Bottomley and Elder made a total of nine arrested landings and deck takeoffs on the *U.S.S. Charger* (CVE-30). The results were extremely satisfactory. This airplane was then used to complete the catapulting and arrestment portion of Board of

Left: *An early Bearcat assigned to the fleet was BuNo.90449, seen here in typical operational configuration over Pearl Harbour, on 27th July 1945* (Photo: U.S.N./National Archives). Right: *Installation of four 20 mm. cannon resulted in the F8F-1C. BuNo. 94803 was assigned to N.A.T.C. for armament tests and evaluation of the effects of the cannon armament on flight characteristics. Seen here at N.A.T.C on 28th September, 1945.* (Photo: U.S.N.)

Inspection and Survey Trials at Mustin Field, with only a minimum number of problems arising. Strong recommendations were made against operating with large asymmetric wing store loads.

BIS trials at NATC began in earnest in March with assignment of *90460* to Armament Test and *90439* to Flight Test for fuel consumption tests. With armament tests just started, the first prototype was lost in a crash and replaced late in March by *90440* to be used for gun firing, rocket and bombing installation tests. Minor damage was also suffered by *90437* while being used for structural build-up tests at Grumman. It was then decided to use this airplane for static tests, no static test airframe having been built. *90441* replaced it in the demonstration programme. *90444* started Acceptance Trials at NATC Flight Test Division on the 1st of April, while *90442* went to Service Test to begin accelerated Service Tests with *90447* joining it a month later. After some two weeks of flying at Flight Test, a number of significant discrepancies were reported, and the airplane was returned to Grumman for incorporation of several modifications. One discrepancy involved operation of the blow-up flaps beginning at too low a speed, giving effectively negative longitudunal stability near approach speeds as they began to blow-up. With an increased pressure setting in the flap system, some improvement was noted but not enough. At high speeds, stick forces were too light; and laterial trim was inadequate to trim the airplane through the speed range. The first two items were considered to have shown significant deterioration from the characteristics exhibited by *90460*. The changes which Grumman incorporated, all going into further production aircraft, included an elevator system bobweight to improve the noted light manoeuvring force gradient, installation of dive recovery flaps, exhaust deflection plates at the leading edge of the wing root, and fin offset decreased from 2° to 1½°. With these changes, the airplane was returned in late May to resume trials.

One other avenue was followed, in keeping with World War II BuAer practice: BuNo *90461* was assigned to NACA Langley in early May for a detailed evaluation of the F8F's flying qualities. At this time also *90446* was assigned to NATC for electrical and electronic trials.

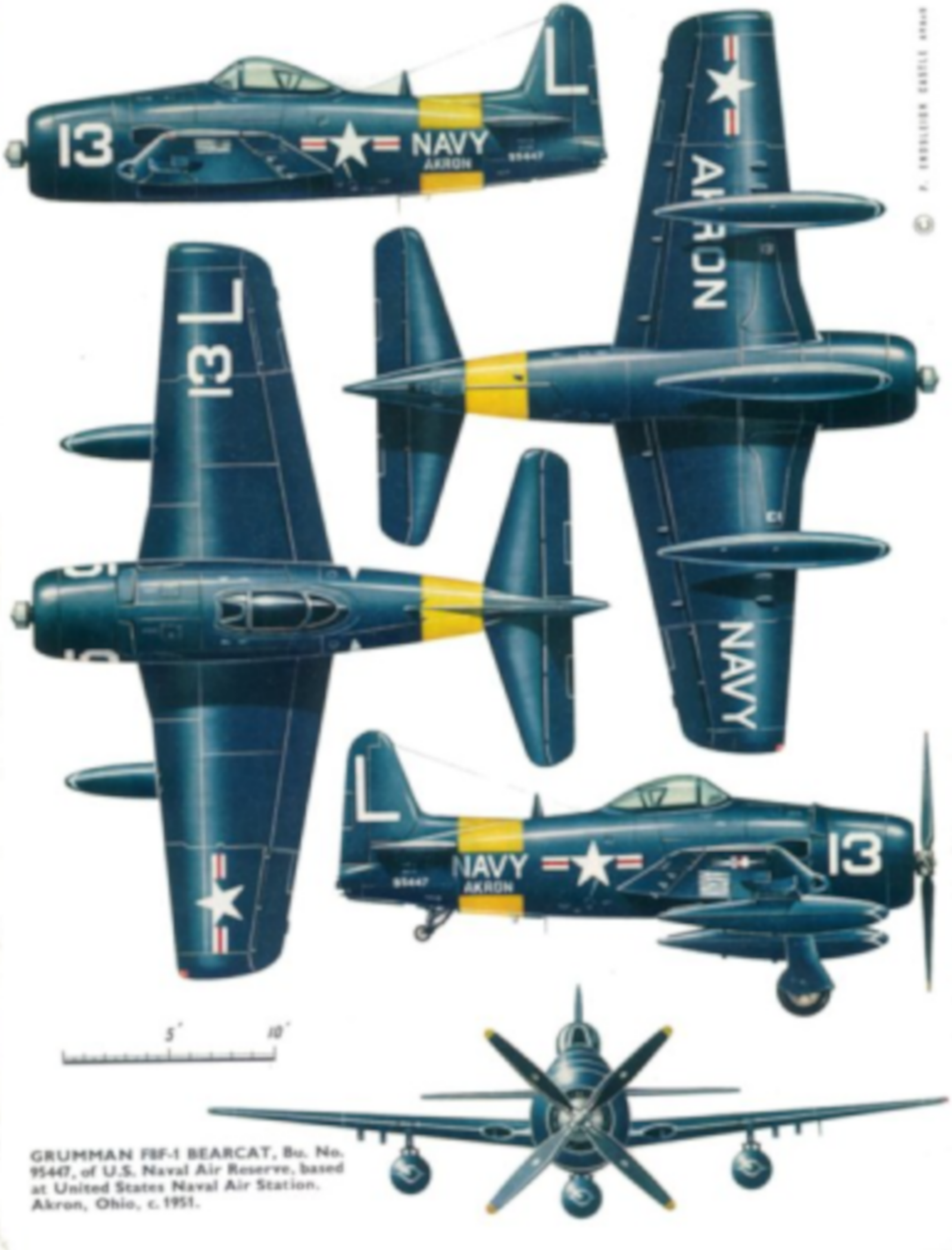
In April, 2,000 additional F8F-1's had been ordered from Grumman, while production deliveries to service units were scheduled to begin in May. With many changes and improvements incorporated, the Bearcat was still close to its intended weight as the initial airplanes for squadron delivery rolled off the line.

BEARCATS FOR THE FLEET

On 21st May, VF-19 at NAAS Santa Rosa, California received the first F8F-1's delivered to a squadron. These included the last of the twenty-three "pilot line" airplanes, followed by the initial airplanes from the first main production order, BuNo *94752* on. Under its skipper, LCDR. Joseph G. Smith, U.S.N., VF-19 began a fast-paced training programme to prepare for combat deployment by late summer. Production deliveries were scheduled for forty airplanes in May, but less than half this number were accepted due to difficulties with installation of the landing gear doors, and to hydraulic system and engine problems. In June deliveries went up to forty-eight. A large portion of these were assigned to VF-19 to expedite training so that the squadron could meet its early deployment schedule.

F8F-1 trials at NATC were proceeding meanwhile; and 100 of the Bearcats under contract at Grumman were ordered with four 20 mm. cannon in place of the four ·50's. BuNo *90446* was used for Electrical and Electronic Trials at NATC with no major problems arising. However, the accelerated Service Trials were beginning to highlight problems with the exhaust system, which suffered almost regular cracking, and with the hydraulic system which experienced many

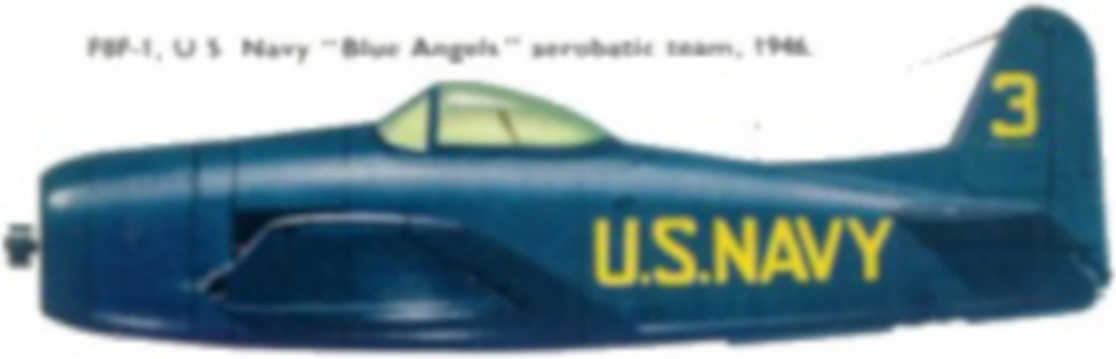
On 17th Feb. 1945, LCDR.'s Bottomley and Elder flew BuNo. 90438 from the U.S.S. Charger *(CVE-30) for the Bearcat's first carrier trials. Nine arrested landings and deck take-offs were completed with only minor problems.*
(Photo: U.S.N./National Archives)


13
L
NAVY
AKRON
95447
5'
10'

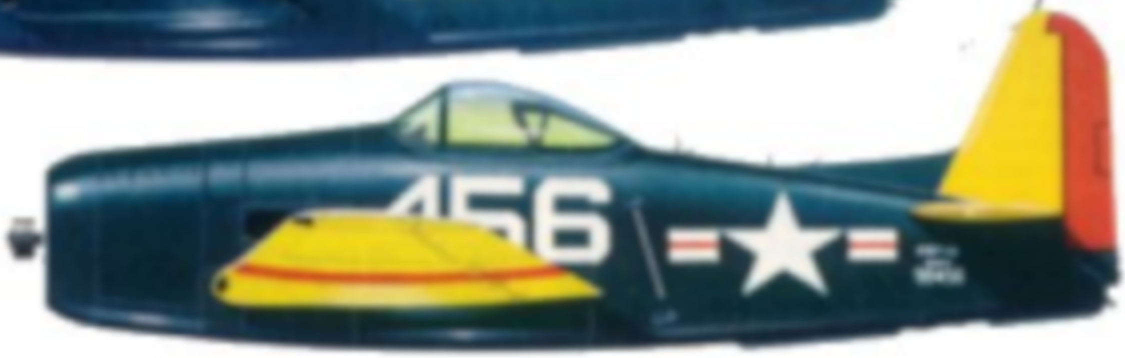
© P. ENDSLEIGH CASTLE ARAeS

GRUMMAN F8F-1 BEARCAT, Bu. No. 95447, of U.S. Naval Air Reserve, based at United States Naval Air Station, Akron, Ohio, c. 1951.

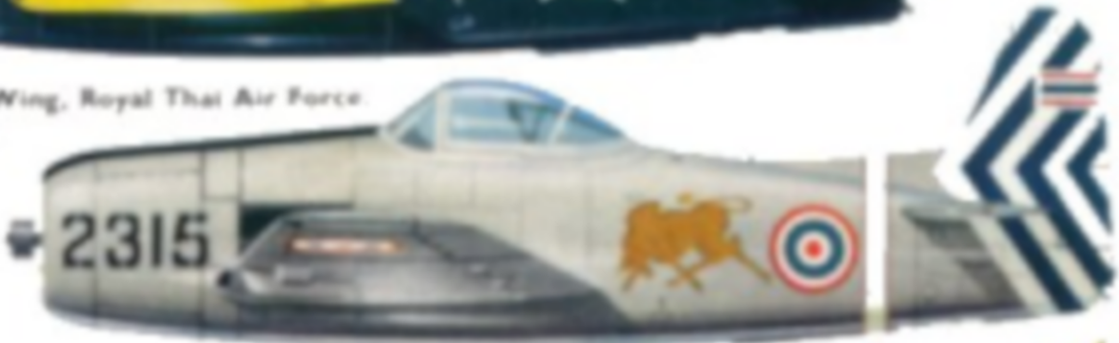
F8F-1, U.S. Navy "Blue Angels" aerobatic team, 1946.

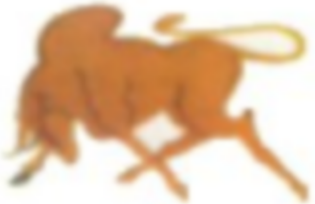


F8F-1D drone control aircraft, U.S. Navy.



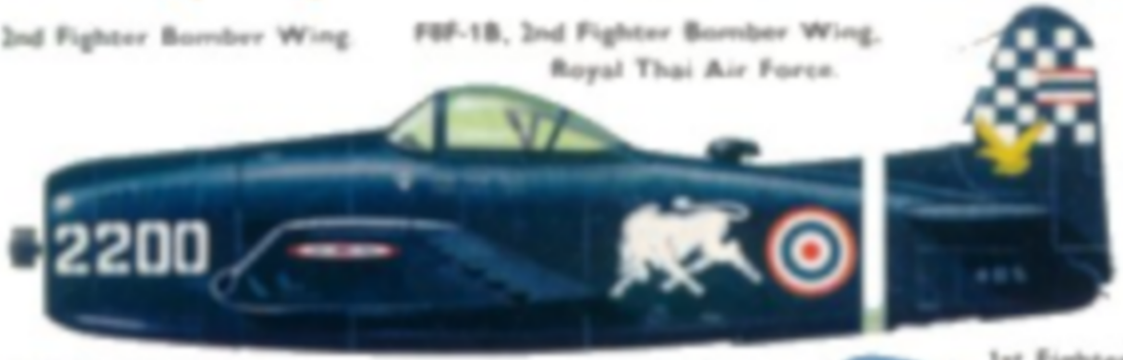
F8F-1B, 2nd Fighter Bomber Wing, Royal Thai Air Force.

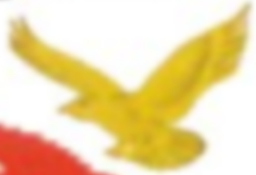


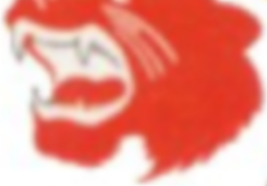


2nd Fighter Bomber Wing.

F8F-1B, 2nd Fighter Bomber Wing, Royal Thai Air Force.

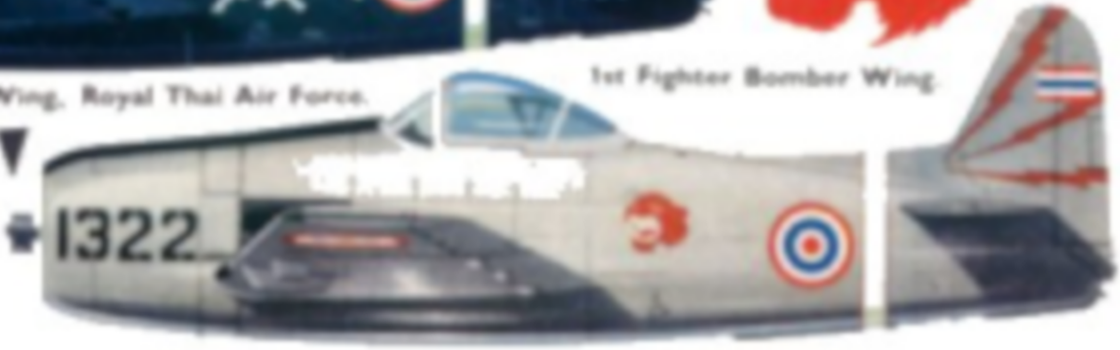


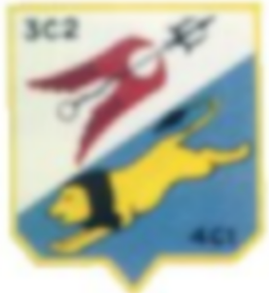




1st Fighter Bomber Wing.

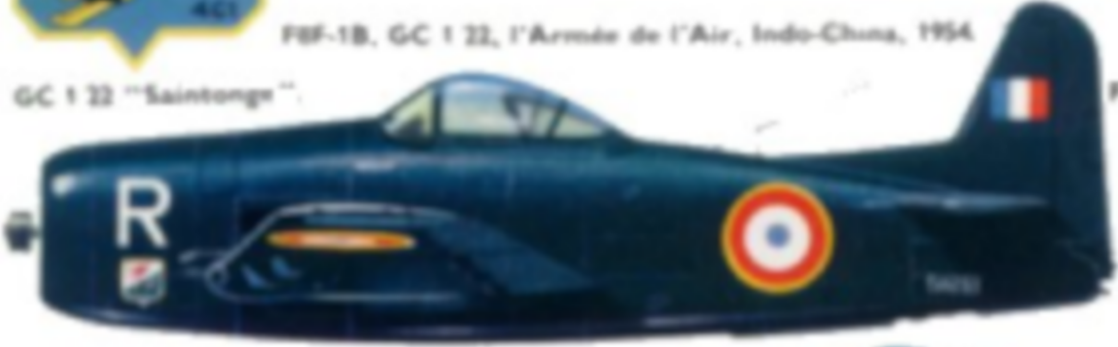
F8F-1B, 1st Fighter Bomber Wing, Royal Thai Air Force.



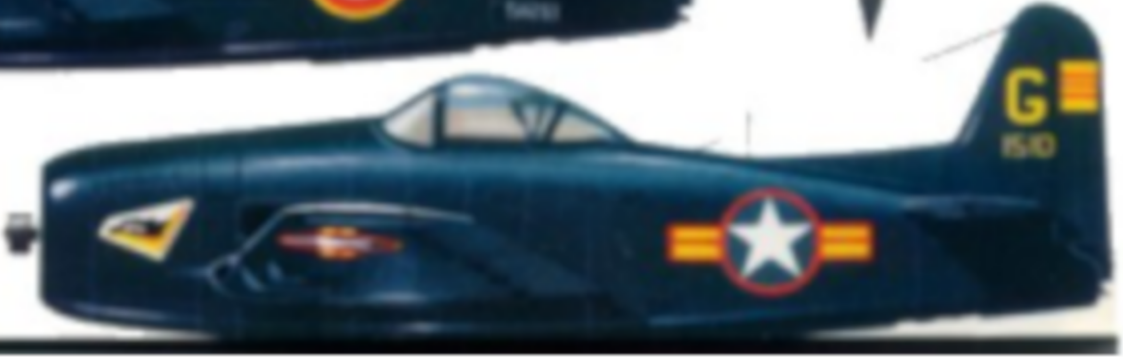


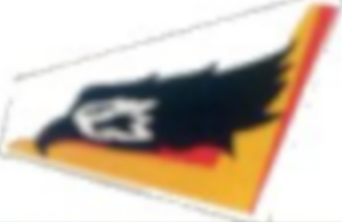
F8F-1B, GC 1 22, l'Armée de l'Air, Indo-China, 1954.

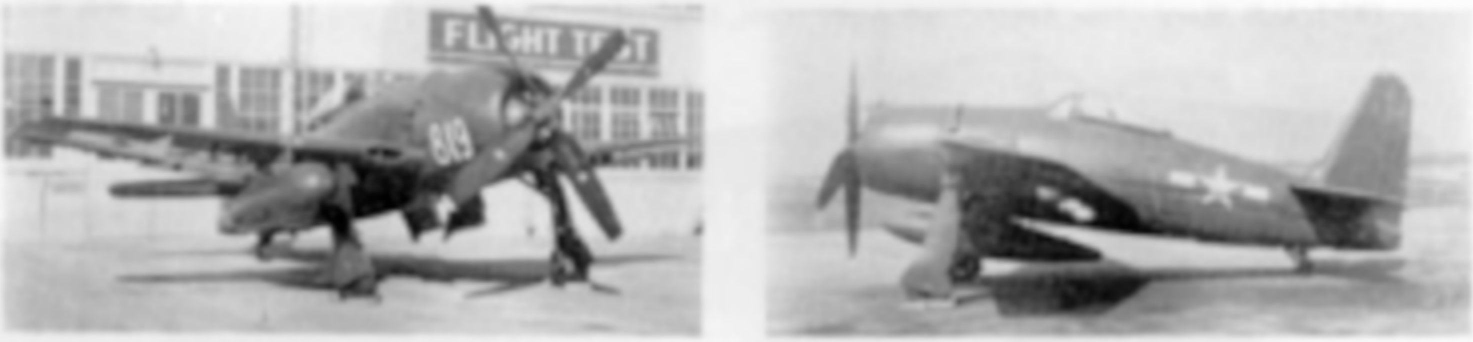
GC 1 22 "Saintonge".



F8F-1, 514th Fighter Squadron, Republic of Vietnam Air Force, 1956. This a/c now on static display at Tan Son Nhut Officers' Club, Saigon.







Left: *One of the two prototypes for the radar-equipped F8F-1N, BuNo.94819 is seen here during evaluation at N.A.T.C. in the autumn of 1945, with a Grumman prototype radar nacelle installed.* (Photo: U.S.N.). Right: *BuNo.94873 at N.A.T.C. in April 1946, during flight development programme of the larger vertical tail which was needed to give adequate stability when the centreline tank was installed. Note rudder chord extension and absence of dorsal fin.* (Photo: U.S.N.)

component failures. At Flight Test, the bobweight in the elevator control was found to give good manoeuvring force characteristics. However tests with the 150 gallon tank installed showed that the directional stability and control characteristics deteriorated seriously when carrying the tank; especially at high speeds where the resultant poor directional characteristics reduced the effectiveness of the airplane as a gun platform. Grumman was requested to take immediate action to solve this problem.

Development of both pod and internal camera installations was underway; and two Bearcats, *94812* and *94819*, had been equipped with radar nacelles suspended from the starboard wing bomb rack as prototypes for AN/APS-19 radar equipped F8F-1N night fighters. One Bearcat was assigned to NOTS Inyokern in July for rocket firing tests.

While the development and test programmes were proceeding relatively smoothly during July, VF-19 was experiencing a major problem—though training was maintained except for a brief period. The problem involved engines cutting out, both intermittently and in five cases completely. Fortunately all of the dead stick landings resulting from the latter were completed without damage. Intermittent cutting-out in cruise flight due to lean mixture conditions was a common occurence; use of auto-rich or alternate air usually corrected the condition. Cutting-out on take-off was attributed at least in part to inadequate procedures for warm-up and run-up prior to take-off. More serious cases of intermittent cutting-out could not be explained in most cases, but the complete cut-outs were traced to diaphragm and seal leakage problems in the fuel feed valve units. All VF-19 Bearcats were grounded for a short period while checks for this leakage were completed. With checks completed and more detailed instructions on engine operations issued, training proceeded. In mid-July, one F8F was lost on each of two successive days from other causes, but carquals on board the *Takanis Bay* (CVE-89) some 10 days later were without serious difficulties.

Only one case of an engine cutting-out intermittently was noted in 386 carrier landings and take-offs. By the end of July the squadron was considered ready for deployment and departed for WesPac aboard the *Langley* on 2nd August. The extra Bearcats used by VF-19 during training were then assigned to the next two F8F-1 squadrons. San Diego based VF-18 sent five pilots up to Santa Rosa; these pilots ferried five Bearcats back on August 9th. The next day VF-18 received its initial Bearcats. As VF-19 sailed westward, two of the test programmes suffered a setback from landing crashes—*90461* was damaged at Langley Field bringing the NACA programme to a halt, and *90442* terminated its accelerated service test period at NATC at the 418 hour point. NACA had confirmed and documented many of the flying qualities characteristics reported by NATC, and had recommended an enlarged vertical tail—with an increased height of around 16 inches to correct the instability problem with external tanks. While these particular portions of the overall programme came to an unplanned halt, two new phases were beginning at NATC: evaluation of flying qualities changes due to the radar nacelle on the F8F-1N, using BuNo *92819* and the tactical test project using BuNo *90446*.

A pilot of VF-20A poses the aircraft of the C.O., LCDR. Caldwell, for William T. Larkins in June 1947. (Photo: W. T. Larkins)

Another view of VF-20A's carrier trials aboard the Tarawa: 95356 inches above the flight deck.
(Photo: Ed Wischnowski)

In mid-August, the Second World War ended. VF-19 had not yet reached combat so the true worth of the F8F would never be known in the War conditions for which it was designed, and for which it promised such superior combat performance. With the end of the war the F3M-1 contract was terminated and all but 770 airplanes were cancelled (twenty-three "pilot line" and 747 under the first Grumman production contract). Production rates were cut back: in August only twenty were delivered as compared to 56 in July, subsequent months of 1945 were to average around fifteen per month. Signficantly, a larger number of F8F's remained on order after the V-J cutbacks than of any other Navy fighter.

With the F8F established in the Navy's postwar programme, test activities and squadron operations continued. In early September, the second accelerated service test airplane (BuNo *90447*) reached 453 hours to complete the Accelerated Service Trials. Within a week, a new phase of accelerated service tests began, using the 151st production airplane (BuNo *94879*) with all up to date changes incorporated. The report of the basic Accelerated Service Trials reflected the general enthusiasm for the Bearcat as a fighter/interceptor. It noted many items on which corrective action had been, or was being taken, and singled out the exhaust and hydraulic systems as the only completely unsatisfactory systems in the airplane. In fact it was noted that the emergency landing gear extension system had been used regularly due to hydraulic system failures, and that the emergency system was 100% reliable!

Standard station markings carried by BuNo.90446, after conversion to an F8F-1D, assigned to Naval Air Development Centre, Johnsville, Pa. (Photo: Ed Wischnowski)

The F8F-1 of CAG 5 banks away in a climbing turn.
(Photo: U.S.N./National Archives)

While Service Test began the new tests with *94879*, Flight Test was assigned F8F-1C BuNo *94803*, with its four 20 mm. cannon installed, to check the effects of the changes on performance and flying qualities. Flight Test had by then concluded a series of tests with Napalm bomb fins attached to the rear of the centreline-mounted 150 gallon tank, and also with the tank turned around backwards to determine the extent of improvement in directional characteristics with these configuration changes. The former was considered to give a useful improvement, but a much more adequate fix was still considered essential.

On the west coast, squadrons continued training, the two CVG-18 squadrons getting ready to go aboard the *Ranger* (CV-4) and go through the Panama Canal to their new Station on the east coast. CVG-19 was to return to the west coast and be based at NAS Alameda. During the remainder of 1945, NATC continued with the various trials programmes and squadron training and operations proceeded in both CVG-18 and -19. All activities were hampered by the rapid turnover in personnel as wartime pilots and ground personnel returned to civilian life. Grumman's production settled at around 15 per month, while their engineers continued to devise changes as problems arose in service and test flying. The major efforts were directed toward correcting the direction stability problem, and finally getting the R-2800-30W "E" engine into the Bearcat. BuNo *94873* was assigned to receive the enlarged vertical tail. It was 12 inches higher, rather than 16 inches as recommended by NACA, since a further increase would have dictated major aft fuselage redesign to carry the higher loads. The problem of obtaining satisfactory overall directional characteristics with the new tail proved to be a major one and it was not until 1947 that the final configuration was to be agreed upon.

December brought the beginning of one of the major problems in the Bearcat's service life; the safety wing tips came under serious review as a result of a fatal accident. It was concluded that one wing tip came off in a very low altitude high speed pull-out, and the aircraft rolled and crashed before the pilot could recover. The operation of the safety wing tips had been demonstrated satisfactorily by Grumman, and adequate control with one tip gone was possible; but the conditions of the accident were beyond any demonstration point. Grumman and Navy engineers initiated a thorough investigation of the wing tips.

The tempo of production and service operations both increased significantly in 1946—production was to average nearly 30 per month throughout the year, while four new squadrons began converting to the Bearcat early in the year. From April on, about one quarter of each month's production was of the 20 mm. cannon version. These had been redesignated F8F-1B on 27th March, along with special armament versions of all other U.S.N. models. The 251st airplane, BuNo *94979* began accelerated service tests at NATC in March, while the 151st completed its tests in April. Results of the test on the latter differed only in detail from those of the initial Service Trials phase. The 251st incorporated many changes, including wing root reinforcements and the first of a number of changes to come on the safety wing tips—substitution of brazier head rivets for countersunk ones in the separation area, and installation of hand holes in the outer panels. These changes resulted from the review initiated after the December accident. A Hamilton Standard propeller was installed on BuNo *94979* for these trials in place of the standard Aeroproducts prop. While these tests were beginning, Armament Trials and the tactical evaluation by NATC Tactical Test Division were winding up. The armament tests concluded that, with the many changes incorporated plus some additional ones, the armament installation was satisfactory. Changes included deflectors at the gun shell ejection chutes to prevent damage to bombs and other wing stores, and a steel strip on the leading edge of the stabilizer which prevented damage from the ejected cases.

Of particular interest in the late Spring of 1946 was the reappraisal of further F8F procurement within BuAer, which was triggered by a mock combat between one of NATC's modified P-80's being used for jet carrier operations development and an F8F piloted by a BuAer pilot—both experienced combat pilots. The BuAer pilot concluded that he was unable to take the initiative at any time, that he could seldom even get in a snap shot, and that the P-80 literally ran circles around the F8F-1. The jets had brought a profound change to fighter aviation in the year and a half since the 1944 Joint Fighter Conference! In the Bureau it was concluded that further procurement of F8F's (and F4U-5's) was needed, until jet fighters were established on operational carriers, but that all efforts to get carrier based jet fighters in service should be pushed to the maximum extent possible.

By the end of 1946, nine fighter squadrons were in service with F8F's, some of them renumbered in the overall squadron renumbering on 15th November. NACA had gotten back into the flight testing of the vertical tail modifications in the summer, using BuNo *94873*, and NATC had also evaluated the enlarged tail. By November, agreement had been reached that an enlarged tail should be on the planned production -2 models, but return to use of the dorsal was recommended with the enlarged tail. The -30W engine was finally installed in the first XF8F-2, BuNo *95049*, and production transition to the -2 was planned for late 1947, under a contract signed in August of 1946. The Bearcat had also made a fine showing of its spectacular rate of climb at the 1946 National Air Races and had been picked for the Navy's new demonstration team, the *Blue Angels*.

The safety wing tips continued to be a problem; a new scheme was developed—explosive charges were placed in each wing at the separation point, both tips being blown off if either one failed.

The Bearcat of the commanding officer of Air Group 19 at N.A.S. Alameda in June 1947. The aircraft, BuNo.95320, carries the B-marking of U.S.S. Boxer. (Photo: W. T. Larkins)

Maj. Al Williams' G-58A "Gulfhawk 4", the one short-lived civilian counterpart of the F8F-1. (Photo: P. M. Bowers)

An F8F-1B of CVG-17, still bearing the R of the U.S.S. Randolph, *parked with folded wings in October 1948.* (Photo: L. S. Smalley)

The Blue Angels' all-yellow "Beetle Bomb" at the Cleveland Air Races in 1949; the aircraft, BuNo.95187, continued in service after the team switched to F9F-2 jets. (Photo: P. M. Bowers)

Meanwhile the use of the F8F expanded; by December of 1947, 19 squadrons had F8F-1's and four had -1B's. All deliveries from late summer on were -1B's—in place of -2's whose production was further delayed. By late in the year, the first jet fighters, McDonnell FD-1's and North American FJ-1's were finally being delivered to the Navy, though these first Navy jet types were never to be built in quantities sufficient to displace the Bearcats as the mainstay of the carrier fighter squadrons.

A civilian Bearcat, especially built for Al Williams as the "Gulfhawk 4" made its first flight in June of 1947; its colourful markings made a bright contrast with the standard dark blue of the Navy Bearcats. Equipped with a civilian P & W R-2800 "C" engine, it was quite similar to the Navy -1 Bearcat. It was quite an attraction at air shows during its short life, which unfortunately ended in a landing accident.

The last -1B Bearcats were delivered in January of

1948, being followed off the line by the -2's. The number of squadrons equipped with F8F-1/-1B's remained fairly constant, taking one last spurt to a total of 24 (some of which also had -2's) late in the year, before starting down in early 1949. Squadrons were again renumbered on 1st September 1948.

1949 saw the F8F-1's begin their second career in the Navy. This included assignment as drone control airplanes, and to advanced training units and reserve bases. The Naval Air Development Centre was given the job of developing a standard drone control configuration, using XF8F-1 BuNo *90456* for the prototype. This modification included removal of two outboard wing guns, installation of the drone control equipment plus additional radio equipment, and new antennae and ballast added to the engine nose to offset the weight of equipment in the radio compartment aft of the cockpit. After testing at NADC, the prototype was evaluated in typical operations by VX-2 and found to be quite satisfactory. That year also saw the end of the safety wing tips; by incorporation of a service change, the break section was eliminated, being brought up to the same level of strength as the rest of the wing.

With the jet fighters entering squadron service, the number of Bearcat-equipped squadrons decreased rapidly (both -1 and -2) during 1949, and when Korean operations began in the summer of 1950, the F8F's were not considered to meet the Navy's mission requirements in these operations, since the Bearcat could not deliver the heavy ordnance loads of the Corsair in ground attack missions.

In 1951, the Bearcat's third career—and its taste of combat—finally began. Ironically, it was to be in the rôle which received only minor consideration during its design, and in which the Navy considered it superfluous for Korean operations: ground attack.

The United States had decided to come to France's aid in Indo-China, by supplying combat aircraft. With direct Chinese intervention a definite threat, ground attack aircraft of many types were supplied. F8F-1 and -1B Bearcats were supplied to the French Expiditionary Air Force, initially equipping two squadrons. Additional Bearcats followed and they played a major rôle in supporting the ground forces against the Viet Minh. They were particularly effective in operating from the fortified camps and giving very close infantry support only short distances from these camps. Some carried cameras in fuselage centreline pods to operate as photo-reconnaissance aircraft. Despite this air support, Dien Bien Phu fell at last, and when the Geneva agreement was signed the French forces withdrew and some surviving Bearcats were turned over to South Vietnam, serving with that country's 514th Fighter Squadron.

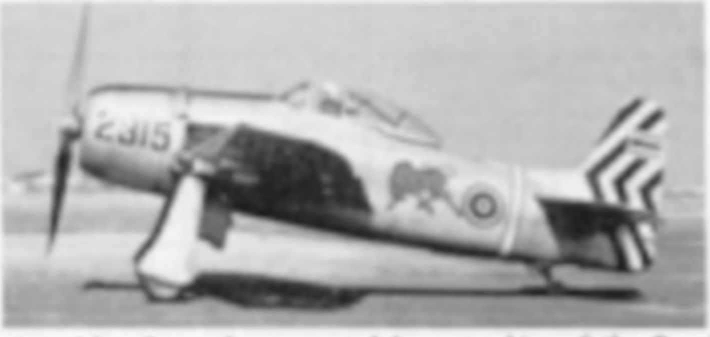
Additional F8F-1 and -1B Bearcats were furnished to Thailand when the U.S. Military Air Advisory Group arrived there to assist in strengthening the Royal Thai Air Force. With this transfer, the remaining Bearcats were being phased out of U.S. Navy operations. By July of 1955 the last units, reserve bases, had turned in their F8F-1's and a year later all were stricken from the Navy inventory. In Thailand they were to continue operating into the early sixties, and at home at least one civilian -1 took on the flashy civilian colours carried by a far larger number of -2's. The Bearcats are not yet gone—and they will surely not be forgotten, particularly by the pilots who flew them.

© *Harold Andrews, 1966.*

Author and publishers gratefully acknowledge the assistance of all those who provided information during the preparation of this Profile, especially A. Van Wayn and L. Pearson of the U.S. Navy; Grant Daly of G.A.E.C.; and David W. Menard.

Posed photo taken 5th June 1950 to commemorate the retirement of F6F-5's from their rôle of advanced trainers, and their replacement by F8F-1's BuNo.95238 in foreground carries racks for practice bombs. (Photo: U.S.N.). *A formation of F8F-1's of Advanced Training Unit Two in April 1951.*
(Photo: U.S.N.)

An aircraft of VF-19 hooks on during carrier operations aboard the Corregidor in August 1945.
(Photo: U.S.N./National Archives)



A garish colour scheme sported by a machine of the Royal Thai Air Force's 2nd Fighter Bomber Wing.
(Photo: Olmsted via Dickey)

F8F-1, ex-Armée de l'Air, of 514th Fighter Squadron, Republic of Vietnam Air Force. The equipment of two French fighter squadrons was turned over to the South Vietnamese after the Dien Bien Phu tragedy of 1954. They served with the 514th Sqdn. until replaced by Skyraiders (see Profile No. 60, The Douglas Skyraider). (Photo: David W. Menard)

Aircraft 27 of VF-19 noses over after running into the barrier cables during the three-day operations aboard the Corregidor (CVE-58). (Photo: U.S.N./National Archives)

Sqdn. Numbers prior to 15th Nov. 1946	Sqdn. Numbers 15th Nov. 1946 to 1st Sept. 1948	Sqdn. Numbers after 1st Sept. 1948
VF-58	VF-1L	
	VF-3A	VF-31
	VF-4A	VF-32
	VF-11A	VF-111
	VF-12A	VF-112
	VF-5A	VF-62
	VF-6A	
	VF-1A	VF-11
	VF-2A	VF-12
	VF-17A	VF-171
	VF-22A	
	VF-14A	VF-142
	VF-15A	VF-151
	VF-16A	VF-152
		(and VF-153, -52, -113, -13, -33, -53, -93, -133, -173, -193.)

DIMENSIONS AND SPECIFICATIONS, F8F-1

General: Span (spread 35·5 ft., (folded) 23·25 ft. Length 27·5 ft. Height (tail wheel on ground, prop blade vertical) 13·67 ft.

Wing: Area 244 sq. ft. Root Chord 115·9 in., Tip Chord (6 in. inbd of tip) 51·5 in. Incidence 3·0°, Twist Dihedral 5·5° Root Section NACA 23018 (modif), Tip Section 23009. Slotted Flaps, 40° maximum deflection, area 18·18 sq. ft. Frise ailerons with spring tabs and trim tab, total area 15 sq. ft. Dive recovery flaps, area 1·38 sq. ft.

Horizontal Tail: Span 15·75 ft. Area 52·27 sq. ft. Elevator area, including trim tabs 18·63 sq. ft. Tail incidence 0·5°.

Vertical Tail: Area 17·7 sq. ft. Rudder area 6·7 sq. ft. Fin offset 1·5° leading edge left.

Engine: P & W R-2800-34W Combat Power (water) 2,400 h.p./2,800 r.p.m./1,000 ft. Military, 2,100 h.p./2,800 r.p.m./S.L.-3,400 ft. 2,700 h.p./2,800 r.p.m./9,500—16,600 ft. Aeroproducts Propeller, 4 blade, diameter 12 ft. 7 in.

Tank Capacities: Fuel, internal tank 183 gal., external centreline 150 gal., external wing 2 × 100 gal. Oil 15 gal. Water 16 gal.

Weights: Empty 7,070 lbs. Gross, Fighter, Full internal fuel 9,334 lbs. Gross, fighter, centreline tank 10,395 lbs. Gross, 2 × 1,000 lb. bombs, centreline tank 12,447 lbs.

Performance: Vmax, fighter, clean (no pylons or shackles) 434 m.p.h. at 19,800 ft., 394 m.p.h./S.L. Vmax, centreline tank, 387 m.p.h. at 22,000 ft., 335 m.p.h./S.L. Rate of climb at S.L., fighter, 4,600 ft./min. Service ceiling, fighter 38,900 ft. Range, fighter, 1,140 miles/265 m.p.h. Range, centreline tank 1,830 miles/169 m.p.h. Stalling speed, power off, landing condition, fighter gross weight, 86 m.p.h.

F8F-1-1B SQUADRON ALLOCATION

Sqdn. Numbers prior to 15th Nov. 1946	Sqdn. Numbers 15th Nov. 1946 to 1st Sept. 1948	Sqdn. Numbers after 1st Sept. 1948
VF-18	VF-19A	VF-191
VBF-18	VF-20A	VF-192
VF-19	VF-7A	VF-71
VBF-19	VF-8A	VF-72
VF-20	VF-9A	VF-91
VBF-20	VF-10A	VF-92
VF-81	VF-13A	VF-131
VBF-82		

Model	Contract	Date (letter of intent)	Delivery	Quantity	U.S.N. s/n	G.A.E.C. s/n	Remarks
XF8F-1	NOas 2419	27th Nov. 1943	31/8/44* & 2/12/44*	2	90460 90461	D-01 D-02	D-01 accepted 26/2/45, crashed NATC 18/3/45
XF8F-1** (F8F-1)	NOas 2419*** NOas 4799	June 1944	Feb.-June 1945	23	90437-90459	D-1—D-23	90456 mod. by NAMU as F8F-1D standard prototype.
F8F-1	—	(Contract 7/11/44)	May 1945-Aug. 1947	747	9475-95498	D-24—D-770	—
XF8F-1N	—	—	—	(2)	94812 & 94819	D-84 & D-91	—
F8F-1N	—	—	Aug.-Nov. 1946	(12)	****	—	—
F8F-1C (-1B)	—	—	Feb. 1946-Aug. 1947	(100)	****	—	Nos. identified include 94803, 94987, 95205.
XF8F-2	—	—	—	(2)	95049 & 95330	D-321 & D-602	—
F8F-1	NOas 8449	(Contract 28/8/46)	Aug. 1947-Jan. 1948	126	121463-121522 122087-122152	D-837—D-896 D-771—D-836	—
G-58A	—	—	23/7/47*	1	—	—	Al Williams' Gulfhawk 4

Series Production table footnotes

* *First flight dates.*
** *Originally these 23 a/c were designated XF8F-1. Sources are inconsistent as to actual designation used, both X and non-X versions can be found.*
*** *Following initial order for two prototypes the contract was modified to cover 23 additional XF8F-1's plus tooling-up for production at 100 a/c per month rate. This effort was subsequently transferred to NOas 4799, the production contract.*
**** *Random BuNo's from the basic range.*

Aircraft Profile and its contents are copyright © Profile Publications Limited, Coburg House, Sheet Street, Windsor, Berkshire, England
Printed in England by Chichester Press Limited, Chichester, Sussex
October 1972 R